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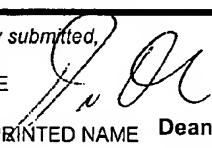
PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION FOR PATENT under 37 CFR 1.53(c).

INVENTOR(S)		
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<input checked="" type="checkbox"/> Additional inventors are being named on the <u>2nd</u> separately numbered sheets attached hereto		
TITLE OF THE INVENTION (280 characters max)		
APPARATUS, SYSTEM AND METHOD FOR ESTABLISHING MULTI-TRANSACTION RELATIONSHIPS WITH VENDING MACHINE CUSTOMERS		
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<input checked="" type="checkbox"/> Applicant claims small entity status. See 37 CFR 1.27.	FILING FEE AMOUNT (\$)	
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<input checked="" type="checkbox"/> The Director is hereby authorized to charge filing fees or credit any overpayment to Deposit Account Number 50-0271	\$80.00	
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The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.		
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Respectfully submitted,

Date **12.09.03**

SIGNATURE 

REGISTRATION NO. **40,484**

TYPED or PRINTED NAME **Dean P. Aldrucci**

(if appropriate)

(203) 461-7337

Docket Number: **03-061**

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INVENTOR(S)/APPLICANT(S)

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Applicant(s): BREITENBACH et al.

Docket No.

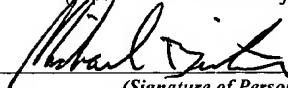
03-061

Serial No.
Not Yet AssignedFiling Date
December 9, 2003Examiner
Not Yet AssignedGroup Art Unit
Not Yet AssignedInvention: **APPARATUS, SYSTEM AND METHOD FOR ESTABLISHING MULTI-TRANSACTION RELATIONSHIPS WITH VENDING MACHINE CUSTOMERS**

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**APPARATUS, SYSTEM AND METHOD FOR ESTABLISHING MULTI-TRANSACTION
RELATIONSHIPS WITH VENDING MACHINE CUSTOMERS**

Provisional Patent Application

Procedural Information

THIS SECTION IS INTENDED FOR INTERNAL PURPOSES ONLY

Walker Digital Docket Number:	03-061
Informal Title:	“Soda Cards”
Case Manager:	Dan Tedesco
Potential Inventors:	Paul T. Breitenbach Sih Y. Lee Paul D. Signorelli Daniel E. Tedesco James A. Jorasch Stephen C. Tulley Geoff Gelman Robert C. Tedesco
Cross-reference to Related Walker Digital Issued Patents:	U.S. Patent No. 6,298,972 (“Subscription Vending”) U.S. Patent No. 6,085,888 (“Subscription Vending”) U.S. Patent No. 5,988,346 (“Subscription Vending”) NOTE: WD had until Oct 9, 2003 to proceed with a “broadening reissue” because the last case in the “subscription vending” family (‘972) issued on Oct 9, 2001. However, JSW decided against a broadening reissue on 9/8/03.
Cross-reference to Related Walker Digital Patent Applications:	97-054, informally “Dynamically Priced Upsells” 97-070, informally “Revenue Managed Vending” 98-119, informally “Vending ‘Switch and Save’” 00-004, informally “Dynamically Priced Upsell Rules” 01-050, informally “Vending Machine Demand Monitor CIP” 02-007, informally “Vending Package Deals CIP” 02-011, informally “Offer Management System” 03-039, informally “Vending Machine Profit Management PRO” 03-045, informally “Take 2’ Vending Machine” 03-056, informally “Vending Machine Email Marketing System” 98-007 and 98-043, informally “Progressive Groceries Discounts”

**APPARATUS, SYSTEM AND METHOD FOR ESTABLISHING MULTI-TRANSACTION
RELATIONSHIPS WITH VENDING MACHINE CUSTOMERS**

Provisional Patent Application

Background Information

Applicants have invented various systems and methods for establishing and managing subscriptions to items sold at vending machines.¹ In some embodiments of Applicant's inventions, a vending machine control system may identify and output an offer for a subscription to one or more products offered at a vending machine. Such subscriptions would enable customers to purchase at least two units of a product, and redeem the products at different points in time (e.g. one the first day, another the following day). Such subscription offers typically would provide customers with the ability to purchase the products at a discount relative to the total of the retail prices of all the units. For example, a customer may be offered the opportunity to purchase a "subscription" to 6 cans of soda, redeemable one per day, for the price of 5 cans. Subscription offers are a useful promotion as they enable the vending machine to increase revenue in a predictable way. Further, any per unit discount provided by the subscription promotion may be economically justified by the guaranteed increase in sales volume that results when the customer accepts the subscription offer, and pays for the subscription.

The benefits of Applicant's prior inventions are significant. However, given the complexity of the consumer marketplace, an ongoing need exists for systems and methods to improve vending machine functionality.

¹ Various systems and methods enabling "subscription vending" are disclosed in Applicant's U.S. Patent No. 6,298,972, entitled METHOD AND APPARATUS FOR ESTABLISHING AND MANAGING VENDING MACHINE SUBSCRIPTIONS, issued October 9, 2001; U.S. Patent No. 6,085,888, entitled METHOD AND APPARATUS FOR ESTABLISHING AND MANAGING VENDING MACHINE SUBSCRIPTIONS, issued July 11, 2000; and U.S. Patent No. 5,988,346, entitled METHOD AND APPARATUS FOR ESTABLISHING AND MANAGING VENDING MACHINE SUBSCRIPTIONS, issued November 23, 1999; the entirety of each is incorporated by reference herein for all purposes.

Abstract

Disclosed herein are various systems and methods for improving the establishment and management of vending machine subscriptions, including systems and methods for constructing, communicating, and registering subscriptions, as well as various methods for processing the redemption of vending machine subscription items. Several additional embodiments are disclosed, including various alternate methods of promoting longitudinal machine-customer relationships.

Definitions Used Herein

Actual Item Velocity – The actual rate at which a given product is sold by a vending machine during a sales period.

Fill Period, Sales Period - The period of time between restock dates.

Full Price, Retail Price – The normal price charged for the purchase of a given product. Typically, subscription offers present customers with the opportunity to purchase items at less than full price.

Ideal Product Velocity, Target Product Velocity, Target Velocity – The desired rate at which a given product should be sold by a vending machine during a sales period. Thus, in some embodiments, an ideal velocity may be set or calculated for each product indicating the rate at which products must be sold in order to deplete the inventory to a certain level by the end of a given sales period (i.e. by the restock time). For example, an ideal product velocity may be calculated by a vending machine control system after an operator inputs a restock date and a desired remaining inventory for the date (e.g. an operator may wish to have only 1 of each item remaining at the restock date so that the machine sells as many items as possible without completely selling out and thereby disappointing customers). Thus, if an operator (a) stocks 50 units of Soda A, (b) inputs a restock date fourteen days away, and (c) indicates that only one unit of Soda A should

remain at the restock date, the control system may divide 49 by 14 to conclude that, on average, 3.5 units must be sold per day within the sales period in order to realize the ideal product velocity. As discussed herein, a vending machine control system may periodically, substantially continuously, or otherwise determine whether or not actual item velocity is at least equal to the ideal item velocity, and if not, may institute subscription promotions as discussed herein.

Operator, Owner, Route Driver – The owner (or agent thereof) of a vending machine.

Redemption, Redemption Transaction- The process by which a customer who has previously accepted a subscription offer, and thereby engaged in a registration transaction, enters a subscription code into an input device that is in communication with a vending machine control system, and receives one or more units of the product indicated by the underlying subscription. In some embodiments, codes may be entered directly by customers (e.g. into a keypad). In other embodiments, codes may be entered via token (e.g. a bar-coded voucher is deposited into a barcode reading bill validator).

Registration, Registration Transaction- The process by which a customer accepts a subscription offer by (1) signaling acceptance of a subscription offer (e.g. pressing a button on a vending machine's keypad), and/or (2) providing payment to a vending machine operator. In some embodiments, registration may take place at a vending machine. In such embodiments, a registration transaction may optionally include the dispensing of a first product or products in a subscription. In other embodiments, registration may take place through a communications network, such as a telephone or computer network.

Registered Subscription- A contractual relationship between a customer and a vending machine operator that is (1) formed upon the customer's acceptance of a subscription offer and (2) recorded and tracked in a database.

Renewal- The process by which a previously registered subscription is identified and updated to reflect a customer's entitlement to additional units of product. In some embodiments, subscriptions are renewed as part of a redemption transaction. In other embodiments, subscriptions may be renewed through a communications network, such as a telephone or computer network.

Restock Date, Restock Time- The time and/or date that a vending machine is scheduled to be restocked by an operator (or agent thereof) of a vending machine.

Subscription Code, Code, Subscription Identifier- A data element that is correlated in a database with a registered subscription. Typically, such data elements are “unique” or substantially unique identifiers. Such data elements may include, but are not limited to, customer Social Security Numbers (SSNs), customer credit or debit card numbers, currency serial numbers (e.g. the serial number of a dollar bill), customer birthdays, and biometric data (e.g. a customer's retinal patterns, fingerprint patterns, topical facial patterns, signatures, or the like). In some embodiments, subscription codes may be stored on tokens, as described herein.

Subscription Offer, Offer- An offer that is provided to a customer proposing that the customer pay a subscription price in exchange for the ability to redeem at least two units of a product or products at a vending machine in at least two transactions. Thus, by accepting subscription offers, customers are able to purchase at least two units of a product, and redeem the products at different points in time (e.g. one the first day, another the following day).

Subscription Price- The price charged in conjunction with the registration of a subscription offer. In some embodiments, the subscription price may be equal to the sum of the full prices of the products indicated by the subscription offer. In other embodiments, the subscription price may be less than the sum of the full prices of the products indicated by the subscription offer. In such embodiments, subscription offers would provide customers with the ability to purchase the products at a discount relative to

the total of the retail prices of all the purchased units. In yet other embodiments, such as the “hard reserve” embodiments described herein, the subscription price may be more than the sum of the full prices of the products indicated by the subscription offer.

Token, Voucher, Card, Certificate- A physical medium for storing subscription codes and identifying registered subscriptions. In various embodiments, tokens may comprise one or more of: credit cards, debit cards, stored value cards, smart cards, or other paper-based or plastic cards, certificates or vouchers. In some embodiments, tokens are “machine readable.” Examples of machine-readable tokens include cards with markings thereon, such as punch holes or bar codes, for optical recognition by a vending machine. Also, machine readable tokens include read/write and read-only magnetic stripe cards. In some embodiments, a single token may identify a single registered subscription (e.g. a code refers to a specific registered subscription in a relational database). In other embodiments, several tokens may identify a single registered subscription (e.g., a booklet of vouchers or several vouchers attached by perforation). During redemption transactions, tokens are presented by customers to a vending machine, which validates tokens (as described herein), and, if appropriate, dispenses one or more units of one or more products.

Detailed Description

I. VENDING MACHINE APPARATUS AND SYSTEM ARCHITECTURE

A. Introduction

Generally, a vending machine in accordance with the present invention can include a device configured to manage sales transactions with customers by, among other things, receiving payment from customers, controlling the pricing and/or distribution of goods and/or controlling entitlements to services.

B. Machine Casing/Cabinetry

In some embodiments, suitable machine cabinetry may be constructed from any combination of (1) commercial grade steel (e.g. sixteen-grade steel for exterior panels

and/or internal shelving), (2) transparent materials such as glass or Plexiglas (e.g. for item display windows), (3) rubber (e.g. for waterproofing insulation), (4) plastic, (5) aluminum, and/or (6) any suitable material.

Many commercially available machine casings can be modified to work in accordance with the present invention. For example, in snack machine embodiments, a suitable machine casing may comprise the 129 SnackShop manufactured by Automatic Products International, Ltd. of Saint Paul, Minnesota, which stands at 72"/1829 mm wide, has a width of 38 7/8"/988 mm, and a depth of 35"/889 mm. Other suitable snack machine casings include the A La Carte® machine from Automatic Products, and the GPL SnackVendor model # 159 from Crane Merchandising Systems/ Crane Co. of Stamford, Connecticut.

In beverage machine embodiments, machine casings commercially available from Dixie Narco, Inc. of Williston, South Carolina may be employed. Beverage machine casings may comprise a “cooler” or “glass front” style front panel, featuring a transparent front panel (e.g. glass) enabling customers to see inventory for sale. An example glass front beverage machine is the DN-55 BeverageMax, available from Dixie Narco. Alternatively, beverage machine casings may comprise a “bubble front” style front panel, featuring a decorative front panel, typically used to advertise a logo of a product manufacturer commercially interested in the vending machine’s operation.

Other embodiments are contemplated as well, including combination snack and beverage vending machine embodiments. A suitable machine casing for such an embodiment includes the Refreshment Center 2, Model # 784, available from Crain Merchandising Systems. Further details concerning the suitability of machine casing/cabinetry are well known in the art, and need not be described in further detail herein.

C. Inventory Storage and Dispensing Mechanisms

Inventory storage and distribution functions of a vending machine configured in accordance with a snack machine embodiment of the present invention may include one or more of: (i) a drive motor, (ii) metal shelves, (iii) a product delivery system (e.g. a chute, product tray, product tray door, etc.), (iv) dual spiral (i.e. double helix) item

dispensing rods, (v) convertible (i.e. extendable) shelves, and/or (vi) a refrigeration unit. In embodiments using the casing of the model 129 SnackShop manufactured by Automatic Products, 3 removable shelves may be employed, together providing for 30 product rows and an inventory capacity of between 185 to 522 commonly vended snack products.

Inventory storage and distribution functions of a vending machine configured in accordance with a beverage machine embodiment of the present invention may include one or more of: (i) metal and/or plastic shelving, (ii) item dispensing actuators/motors, (iii) product delivery chutes, and/or (iv) a refrigeration unit.

Further details concerning vending machine inventory storage and dispensing mechanisms are well known in the art, and need not be described in further detail herein.

D. Payment Processing Mechanisms

The vending machine may also include one or more mechanisms for receiving payment and dispensing change, including a coin acceptor, a bill validator, a card reader (e.g. a magnetic stripe reader) and a change dispenser.

In a manner known in the art, a magnetic stripe card reader may read data on the magnetic stripe of a credit or debit card, and it may cooperate with conventional point-of-sale credit card processing equipment to validate card-based purchases through a conventional transaction authorization network. Suitable card-based transaction processing systems and methods are available from USA Technologies, Inc., of Malvern, Pennsylvania and Mars Electronics, Inc., of West Chester, Pennsylvania.

The coin acceptor, bill validator and change dispenser may communicate with a currency storage apparatus (a “hopper”) and may comprise conventional devices such as models AE-2400, MC5000, TRC200 by Mars Electronics, Inc., or CoinCo model 9300-L. The coin acceptor and/or bill validator may receive and validate currency that is stored by the currency storage apparatus. Further, a bill validator and/or coin acceptor may be capable of monitoring stored currency and maintaining a running total of the stored currency, as is discussed with reference to U.S. Patent No. 4,587,984, entitled COIN TUBE MONITOR MEANS, the entirety of which is incorporated by reference herein for all purposes. The change dispenser activates the return of coinage to the

customer where appropriate. Such apparatus may feature Multidrop Bus (MDB) and/or Micromech peripheral capabilities, as is known in the art.

In another embodiment, a vending machine in accordance with the present invention may be configured to receive payment authorization and product selection commands through a wireless device communication network, directly or indirectly, from a customer's wireless device (e.g. a cellular telephone). In such an embodiment, a payment processing mechanism may comprise a cellular transceiver operatively connected to a processor, as described herein. Systems and methods allowing for the selection of and payment for vending machine articles through cellular telephones are provided by Nokia Corporation, or by USA Technologies, Inc., of Wayne, Pennsylvania. Further, in such an embodiment, a customer cellular telephone may serve as an input/output device, as described herein.

Further details concerning vending machine payment processing mechanisms are well known in the art, and need not be described in further detail herein.

E. Input/Output Devices

In accordance with the present invention, a vending machine may include an input device for receiving input from (i) a customer indicating a product and/or offer selection/acceptance, and/or (ii) an operator (or agent thereof) during stocking or maintenance of the vending machine. Also, a vending machine may include one or more output devices for outputting product or offer information to a customer or operator.

Many combinations of input and output devices may be employed in accordance with the present invention. In some embodiments, a vending machine may include more than one input device. For example, vending machine may include an exterior input device for receiving customer input and an interior input device for receiving operator input. In some embodiments, however, the input device provides the dual functionality of receiving input data from both operators and customers. Likewise, a vending machine may comprise more than one output device (e.g. an LCD screen and several LEDs, as described herein). However, in some embodiments, such as those which feature touch screens (described herein), input and output functionality may be provided by a single device.

Many input devices are contemplated. Thus, an input device may comprise one or more of (1) a set of alpha-numeric keys for providing input to the vending machine, such as the Programmable Master Menu® Keypad, (2) a selector dial, (3) a set of buttons associated with a respective set of item dispensers, (4) a motion detector sensor, (5) a barcode reader (e.g., such as the barcode reader described in the coupon-accepting bill validator of U.S. Patent No. 6,044,952, entitled MULTI-FUNCTION OPTICAL SENSOR FOR A DOCUMENT ACCEPTOR, the entirety of which is incorporated by reference herein for all purposes), (6) a microphone and/or voice recognition module, (7) a Dual-Tone Multi-Frequency receiver/decoder, (8) a wireless device (e.g. a cellular telephone or wireless Personal Digital Assistant), (9) a biometric sensing apparatus (e.g. fingerprint scanner, retinal scanner, facial recognition apparatus), and/or (10) any other conventional input device commonly employed by a vending machine designer.

Likewise, many output devices are contemplated. For example, an output device may comprise a Liquid Crystal Display (LCD). Alternatively or additionally, an output device may also comprise one or more Light Emitting Diode (LED) displays (e.g. several alphanumeric LED displays on the shelves of a vending machine associated proximately with each row of product inventory).

In one embodiment, an LED display screen is mounted atop the vending machine (via bolts or other mounting hardware) and is used to communicate offers and other messages (e.g. subscription offers) to prospective customers. A suitable LED display screen for such an embodiment may be housed in an aluminum case having a length of 27.5", a height of 4.25", and a depth of 1.75". Such a display screen may have a display area capable of showing alphanumeric and/or graphical characters. Further, such an LED display screen may comprise a serial computer interface, such as an RJ45/RS232 connector, for communicating with a processor, as described herein. Further still, such an LED display may be capable of outputting text and graphics in several colors (e.g. red, yellow, green, black) regarding current and upcoming promotions.

Further, in some embodiments, an output device comprises a printer. In one embodiment, a printer is configured to print on card stock paper (e.g. 0.06mm to 0.15mm thickness). An exemplary printer capable of printing on card stock is the EPSON EU-T400 Series Kiosk Printer. Further, a printer may be capable of the thermal line printing

of various alphanumeric and graphical symbols in various font sizes. Suitable thermal printers include the PSA 66 available from Seiko Instruments, and the Primex model number NP345T available from the Nippon Equipment Corporation. Such printers may be configured to print on pre-perforated cards or dollar-bill sized thermal paper sheets, and/or on rolled thermal paper. A printer of the present invention may communicate with a processor (described herein) via an RS232/IEEE 12834 and/or bi-directional parallel connection.

Additionally, in some embodiments, an output device comprises an audio module, such as an audio speaker, that outputs information to customers audibly.

As stated, in some embodiments, a touch-sensitive screen may be employed to perform both input and output functions. Suitable, commercially available touch screens for use in accordance with the present invention are manufactured by Elo TouchSystems, Inc., of Fremont, California, such as Elo's AccuTouch series touch screens. Such touch screens may comprise: (i) a first (e.g. outer-most) hard-surface screen layer coated with an anti-glare finish, (ii) a second screen layer coated with a transparent-conductive coating, (iii) a third screen layer comprising a glass substrate with a uniform-conductive coating. Further, such touch screens may be configured to detect input within a determined positional accuracy, such as a standard deviation of error less than ± 0.080 -inch (2 mm). The sensitivity resolution of such touch screens may be more than 100,000 touchpoints/in² (15,500 touchpoints/cm²) for a 13-inch touch screen. For such touch screens, the touch activation force required to trigger an input signal to the processor (described herein) via the touch screen is typically 2 to 4 ounces (57 to 113 g). Additionally, touch screens for use in accordance with the present invention may be resistant to environmental stressors such as water, humidity, chemicals, electrostatic energy, and the like. These and other operational details of touch screens (e.g. drive current, signal current, capacitance, open circuit resistance, closed circuit resistance, etc.) are well known in the art and need not be described further herein.

F. Logic/Control/Processing Apparatus

The components of the vending machine, including the input device(s), output device(s), coin acceptor, bill validator, card (e.g. magnetic stripe) reader, change

dispenser, currency storage apparatus, and product dispensing mechanism(s) (collectively, the “peripherals”) communicate with, and are controlled by, a control system or processor, such as one based on the Intel® Pentium® or Centrino™ series processor. The processor may be in communication with a memory and a communications port (e.g., for communicating with one or more other computers or vending machines). The memory may comprise an appropriate combination of magnetic, optical and/or semiconductor memory, and may include, for example, Random Access Memory (RAM), Read-Only Memory (ROM), a compact disc and/or a hard disk. The memory may comprise or include any type of computer-readable medium.

The processor and the memory may each be: (i) located entirely within a single computer or other device; or (ii) connected to each other by a remote communication medium, such as a serial port cable, telephone line or radio frequency transceiver.

A memory may store a program for controlling a processor. The processor performs instructions of the program, and thereby operates in accordance with the present invention, and particularly in accordance with the processes described in detail herein. The program may be stored in a compressed, uncompiled and/or encrypted format. The program furthermore includes program elements that may be necessary, such as an operating system, a database management system and “device drivers” for allowing the processor to interface with the peripherals. Appropriate program elements are known to those skilled in the art, and need not be described in detail herein.

The term “computer-readable medium” as used herein refers to any medium that participates in providing instructions to a processor for execution. Such a medium may take many forms, including but not limited to, non-volatile media, volatile media, and transmission media. Non-volatile media include, for example, optical or magnetic disks, such as memory. Volatile media include dynamic random access memory (DRAM), which typically constitutes the main memory. Transmission media include coaxial cables, copper wire and fiber optics, including the wires that comprise a system bus coupled to the processor. Transmission media may carry acoustic or light waves, such as those generated during radio frequency (RF) and infrared (IR) data communications. Common forms of computer-readable media include, for example, a floppy disk, a flexible disk, hard disk, magnetic tape, any other magnetic medium, a CD-ROM, DVD,

any other optical medium, punch cards, paper tape, any other physical medium with patterns of holes, a RAM, a PROM, an EPROM, a FLASH-EEPROM, any other memory chip or cartridge, a carrier wave as described hereinafter, or any other medium from which a computer can read. Various forms of computer readable media may be involved in carrying one or more sequences of one or more instructions to a processor for execution.

According to an embodiment of the present invention, the instructions of the program may be read into a main memory from another computer-readable medium, such as from a ROM. The execution of sequences of the instructions in a program causes the processor to perform the process steps described herein. In alternate embodiments, hard-wired circuitry may be used in place of, or in combination with, software instructions for implementation of the processes of the present invention. Thus, embodiments of the present invention are not limited to any specific combination of hardware and software.

The memory also may store one or more databases. Some or all of the data stored in each database is described herein. The described data represents exemplary information only; those skilled in the art will understand that the number, content, and form of the data can be different from that which is described herein without departing from the spirit and scope of the invention. Further, despite any description of the databases as tabular, relational databases, an object-based model could be used to store and manipulate the data types of the present invention and likewise, object methods or behaviors can be used to implement the processes of the present invention.

Thus, the machine's processing apparatus, in conjunction with the peripherals (e.g. through RS232 connections and/or other suitable connections), manages interactions with the user in accordance with stored business logic, described herein.

G. Retrofitting Conventional Vending Machines with a Separate Device

In one embodiment, one or more of the processor, the input device(s), RAM, ROM, output device(s) and a data storage device may be included, wholly or partially, in a separate device, such as the e-Port™ by USA Technologies, Inc., that is in communication with a vending machine. The separate device may also be in communication with a network such as the Internet.

The e-Port™ is a credit and smart card-accepting unit that controls access to office and MDB vending equipment, and serves as a point of purchase credit card transaction device. The e-Port™ includes an LCD that allows for the display of color graphics, and a touch sensitive input device (touch screen) that allows users to input data to the device. The display may be used to prompt users interactively with, e.g., subscription offers and information about their transaction status.

The separate device may alternatively be a programmed computer running appropriate software for performing the necessary functions described herein. The separate device may be operable to receive input from customers, receive payment from customers, exchange information with a remotely located server and/or display messages to customers (e.g. subscription offers). The separate device may be operable to instruct the vending machine that appropriate payment has been received (e.g., via a credit card read by the separate device) and/or that a particular product should be dispensed by the vending machine. Further, a separate device may be operable to instruct the vending machine to output subscription offers.

Thus, a separate device may be operatively connected to a vending machine to perform the inventive processes described herein. In this manner, conventional vending machines may be retrofitted with such separate devices so as to perform the inventive processes described herein.

H. Network Embodiments

The present invention can be configured to work in a network environment including a computer that is in communication, via a communications network, with one or more vending machines. The computer may communicate with the vending machines directly or indirectly, via a wired or wireless medium such as the Internet, LAN, WAN or Ethernet, Token Ring, or via any appropriate communications means or combination of communications means. Each of the vending machines may comprise computers, such as those based on the Intel® Pentium® or Centrino™ processor, that are adapted to communicate with the computer. Any number and type of machines may be in communication with the computer.

Communication between the vending machines and the computer, and among the vending machines, may be direct or indirect, such as over the Internet through a Web site maintained by the computer on a remote server, or over an on-line data network including commercial on-line service providers, bulletin board systems and the like. In yet other embodiments, the vending machines may communicate with one another and/or the computer over RF, cable TV, satellite links and the like.

Some, but not all, possible communication networks that may comprise the network or be otherwise part of the system include: a local area network (LAN), a wide area network (WAN), the Internet, a telephone line, a cable line, a radio channel, an optical communications line, and a satellite communications link. Possible communications protocols that may be part of the system include: Ethernet (or IEEE 802.3), SAP, ATP, Bluetooth™, and TCP/IP. Communication may be encrypted to ensure privacy and prevent fraud in any of a variety of ways well known in the art.

Those skilled in the art will understand that vending machines and/or computers in communication with each other need not be continually transmitting to each other. On the contrary, such vending machines and/or computers need only transmit to each other as necessary, and may actually refrain from exchanging data most of the time. For example, a vending machine in communication with another machine via the Internet may not transmit data to the other machine for weeks at a time.

In an embodiment, a server computer may not be necessary and/or preferred. For example, the present invention may, in one or more embodiments, be practiced on a stand-alone vending machine and/or a vending machine in communication only with one or more other vending machines. In such an embodiment, any functions described as performed by the computer or data described as stored on the computer may instead be performed by or stored on one or more vending machines.

In other embodiments, a vending machine may be in communication with a remote computer, such as a server, that provides the vending machine with and/or receives from the vending machine, e.g., all or some of the data described herein. Thus, in certain embodiments, the server may comprise certain elements or portions of certain elements such as a data storage device/ memory.

In such an embodiment, the remote computer could be accessible, directly or indirectly, via a second computer (communicating over the Internet or other network) by a customer or another user (e.g. an owner of the vending machine or agent thereof, such as a route driver). Accordingly, a customer or other user of the second computer could communicate with the remote computer via a Web browser. The second computer could, e.g., receive from the remote computer messages described herein as being output by the vending machine, and/or transmit to the remote computer input described herein as being provided to the vending machine. Similarly, various data described herein as received through an input device of a vending machine may be received through a Web browser communicating with a remote server, which in turn communicates with the vending machine. Thus, an owner/operator of the vending machine may have remote polling and reporting capabilities, may be able to transmit new business rules (e.g. new subscription offers) to the vending machine, and the like.

II. VENDING MACHINE LOGIC: STORED RULES, DATA AND ASSOCIATED PROCESS STEPS

A. General Software Architecture

In one embodiment, a software-based control system executes instructions for managing the operation of the vending machine, and in particular in accordance with the inventive functionality described herein. Such vending machine operations include, but are not limited to: (1) identifying a subscription offer, (2) outputting a subscription offer, (3) registering a subscription, and (4) processing the redemption of subscription items.

In some embodiments, machine peripherals (e.g. machine hardware, including mechanical hardware such as input devices, output devices, inventory dispensing mechanisms, and payment processing mechanisms including coin acceptors, bill validators, card readers, change dispensers, etc.) will be controlled by the software-based control system through a standard RS-232 serial interface. In such embodiments, embedded API/devices may be used to enable the software to actuate/control vending machine peripherals via RS-232 connectivity. Such vending machine peripherals may be operatively connected to the control system directly or indirectly, in any manner that is practicable.

As illustrated by Figure 1, in one embodiment a vending machine control system can be divided into three abstract components. Such division may provide a clear partition of tasks, which may be desirable so that any future modification and new programming can be applied without disrupting other components. Turning to Figure 1, the three abstract components are illustrated, including a Business Logic component 10, a Control Layer component 20, and an exemplary Machine Peripheral component 30. As stated earlier, more machine peripherals may be employed. The Business Logic component 10 is connected to Control Layer component 20 via API 15; Control Layer component 20 is connected to Machine Peripheral component 30 via API 25.

Turning to Figure 1, the Business Logic component 10 visually represents the portion of the software that manages subscription offers, as discussed herein. Such a component may involve a rules database and an inventory database to perform such functions. The Control Layer component 20 visually represents the portion of the software which interfaces with at least one Machine Peripheral component 30, and thereby transmits commands to perform such functions as: (i) outputting subscription offer information via an output device (i.e. a Machine Peripheral component 30), (ii) dispensing products via a product dispensing mechanism (i.e. a Machine Peripheral component 30), and/or (iii) dispensing change due to a customer via a payment processing mechanism, which may include a change dispenser and a currency storage apparatus (i.e. several Machine Peripheral components 30). As stated, the Machine Peripheral component 30 generally represents machine hardware, including mechanical hardware such as input devices, output devices, inventory dispensing mechanisms, and payment processing mechanisms including coin acceptors, bill validators, card readers, change dispensers, etc.

B. Process Steps

As stated, disclosed herein are various methods for improving the establishment and management of vending machine subscriptions. Generally, a subscription is processed by a vending machine by (1) identifying a subscription offer, (2) outputting a subscription offer, (3) registering a subscription, and (4) processing the redemption of

subscription items. Various embodiments are disclosed for alternate methods of performing these steps, as may be desirable or suitable in different contexts.

Step 1: Identify a subscription offer.

The vending machine control system may identify subscription offers in a plurality of ways. In one embodiment, as in Applicant's U.S. Patent Nos. 6,298,972, 6,085,888, and 5,988,346, subscription offers may be predefined and stored in a database accessible to the control system. In other embodiments, as discussed herein, subscription offers may be constructed dynamically according to stored rules that consider the supply of and demand for vending machine inventory.

Subscription offers may be for particular products (e.g. Coke®) or for categories of products. Categories of subscription products may include, for example, (1) product types (e.g. soda, including Coke®, Sprite® and A&W® Root Beer), (2) products priced in a certain way (e.g. drinks priced at \$.50; or drinks priced between \$.50 and \$.75), and (3) products within a certain inventory group (e.g. drinks indicated by a colored LED). It should be noted that, in embodiments featuring subscription offers for categories of products, revenue and profit management functionality disclosed in Applicant's co-pending U.S. Patent Application Serial Nos. 08/947798², 60/511875³, 60/473815⁴ and 60/491215⁵ may be employed so that, during a redemption transaction (Steps 4-6, below), the products available for redemption may be determined based on changes in supply and demand. For example, if a customer subscribes to \$.50 drinks, price-management functionality may be employed to determine which products the customer may redeem (i.e. prices for certain products may have fallen to or below \$.50, and such products would accordingly be eligible for redemption). Or, if a customer subscribes to items in

² U.S. Patent Application Serial No. 08/947798, entitled METHOD AND APPARATUS FOR DYNAMICALLY MANAGING VENDING MACHINE INVENTORY PRICES (Attorney Docket No. 97-070), is incorporated in its entirety herein for all purposes.

³ U.S. Patent Application Serial No. 60/511875, entitled METHOD AND APPARATUS FOR DYNAMICALLY MANAGING VENDING MACHINE INVENTORY PRICES (Attorney Docket No. 03-050), is incorporated in its entirety herein for all purposes.

⁴ U.S. Patent Application Serial No. 60/473815, entitled APPARATUS, SYSTEM AND METHOD FOR PROFIT MANAGED VENDING MACHINE TRANSACTIONS (Attorney Docket No. 03-039), is incorporated in its entirety herein for all purposes.

⁵ U.S. Patent Application Serial No. 60/491215, entitled APPARATUS, SYSTEM AND METHOD FOR VENDING A COMBINATION OF PRODUCTS (Attorney Docket No. 03-045), is incorporated in its entirety herein for all purposes.

the “red” inventory group, “inventory grouping” functionality described in U.S. Patent App. No. 60/491215 may be used to profitably determine which items should be allocated to the red inventory group, and thus redeemable by the customer during a redemption transaction (Steps 4-6, below). It should be noted that subscriptions to inventory groups might be marketed to customers as “value” or “club price” subscriptions to clearance items.

In one embodiment, as disclosed in Applicant’s U.S. Patent Nos. 6,298,972, 6,085,888, and 5,988,346, predefined subscription offers are output to all customers routinely. However, in another embodiment, subscription offers may be “triggered” upon the occurrence of certain conditions. That is, stored rules may provide that certain offers are to be output to customers upon the occurrence of certain conditions detectable by the vending machine control system. In Applicant’s co-pending U.S. Patent Application Serial Number 60/473815, Applicants disclosed the provision of vending machine subscription offers in response to a customer’s selection of a particular product. Further, Applicants disclosed an embodiment therein in which customers who have already deposited the amount necessary for the purchase of a single unit are offered a subscription for an amount equal to his or her change due. For example, if the customer deposits \$5.00 and selects an item priced at \$.50/unit, the machine may offer 12 units redeemable over the span of several days in exchange for the \$4.50 that otherwise would be returned to the customer. Alternatively, customers who have already deposited the amount necessary for the purchase of a single unit may be prompted to deposit additional currency in order to accept a subscription offer.

Subscription offers may also be triggered in additional, alternate ways. In some embodiments, one or more subscription offers may be triggered upon the deposit of a particular currency amount and/or denomination. For example, as illustrated by Figure 3, if a customer deposits a \$5 bill into a vending machine’s bill validator, the vending machine control system may be programmed, through stored rules, to output one or more predefined or dynamically configured subscription offers. An exemplary database illustrating rules for the credit-balance triggered output of predefined subscription offers follows:

Deposit Amount	Subscription Offer Terms and Conditions	Subscription Offer Content
\$5	Subscription to 6 cans of Sprite®	“Get a free can of Sprite® by subscribing to 6 cans of Sprite for your deposited \$5! Just press ACCEPT button on touch screen now and receive soda card from printer.”
\$10	Subscription to 12 cans of Sprite®	“Get <i>two free cans</i> of Sprite! Subscribe to 12 cans of Sprite for your deposited \$10. Just press ACCEPT button on touch screen now.”
\$20	Subscription to 25 cans of Sprite®	“ <u>Save 20%</u> ! Subscribe to 25 cans for your \$20. Just press ACCEPT button on touch screen.”

Assuming in the above example that cans of Sprite were priced at \$1/unit, customers may save by accepting the above exemplary subscription offers.

In some embodiments, the terms and conditions of subscription offers may be dynamically determined, according to, for example, stored rules that consider supply and demand states of a vending machine's inventory. For example, subscription offers may be dynamically constructed using relational databases. The following table illustrates an exemplary subscription offer rules database for use in such an embodiment:

Time until end of fill period	Subscription Offer Construction Rules	Subscription Offer Content
3 days until end of fill period	Output offer for subscription to canned soda product having the greatest actual velocity to ideal velocity ratio. Terms: 8 sodas for \$5.	“Subscribe to 8 cans of [soda X] for \$5. Press ACCEPT button on touch screen now!”
5 days until end of fill period	Output offer for subscription to soda product with the greatest margin. Terms: 12 sodas for \$10.	“Subscribe to 12 cans of [soda Y] for \$10. Press ACCEPT button on touch screen now!”
10 days until end of fill period	Output offer for subscription to soda product with most units in inventory. Terms: 25 sodas for \$20.	“Subscribe to 25 cans of [soda Z] for \$20. Press ACCEPT button on touch screen now!”

Thus, by referencing such a database in conjunction with an inventory database (not shown) which tracks, for each product, such data as the product name/identifier, category (e.g. “soda”), price, cost, target sales rate, actual sales rate, and the like, the

vending machine control system would be able to determine, at the appropriate time in the fill period, how to populate the appropriate subscription offer content, thereby dynamically constructing subscription offers.

In another dynamic offer construction embodiment, subscription offer terms are dynamically constructed according to, for example, the actual and/or ideal sales rate of a particular product. For example, based on a product's actual sales rate, the vending machine control system may determine that, at the current retail price, the product is not likely to reach its ideal sales rate, and as a result will likely have remaining units in inventory at the end of the fill period, absent a promotion to increase demand for the product. Accordingly, the control system may dynamically construct subscription offer terms for the product that are intended to clear the inventory of the product by the end of the fill period.

For example, assuming a product was originally stocked with 10 units at the beginning of a 10-day fill period, the product's ideal sales rate would be 1/day. Assuming further that the retail price is set at \$1.00, and that the actual sales rate is .5/day, it may be determined that the price per unit should be set to \$.50 in order to sufficiently stimulate demand so that supply is depleted by the end of the fill period. Thus, assuming there are six units remaining in inventory, the control system may construct a subscription offer for six units at \$3, reflecting a price savings of \$.50/unit.

Such an embodiment may be desirable as it allows vending machine operators to deeply discount inventory while guaranteeing a sufficiently offsetting sales volume through the subscription offer. That is, such subscription offers are superior to simply discounting per unit retail prices because customers are required to pre-purchase enough units to justify the discount. It should be noted that, in further embodiments, such dynamically-determined subscription terms (e.g. subscription prices, quantities) might also consider (1) the expected demand for a particular subscription (i.e., acknowledging that "subscription" offers may have different demand characteristics than per unit sales at retail prices), and (2) the expected redemption rate for items in such subscriptions.

In yet another dynamic offer construction embodiment, subscription offers are generated according to overall machine sales patterns. For example, if sales volume at a particular machine is below a certain threshold (e.g. 2 transactions/hour) between the

hours of 7PM and 7AM daily, subscription terms may be constructed so that redemption of subscription items may only be permitted during such off-peak times. Further, in one such embodiment, vending machine subscription offers with off-peak redemption conditions may be output if the vending machine determines, via a motion detector, that the ratio of people in the vicinity of the vending machine during a certain period of time to the number of people transacting within the period of time surpasses a certain threshold, indicating that several potential customers are not getting served as a result of high demand and long lines. Thus, subscription offers with off-peak redemption conditions may serve to balance the overall demand for vending machine products throughout the fill period.

Many miscellaneous additional and alternate embodiments with respect to subscription terms are contemplated. In various embodiments, subscription activity periods may begin and/or expire based on fill periods (restock dates). Further, in some embodiments, subscription terms may be customizable. For example, customers may input a request to purchase a subscription to a certain quantity of a product or products. The vending machine control system may then calculate a price and/or terms for the requested subscription based on revenue and profit management considerations (e.g. current sales rates, ideal sales rates, etc.). For example, if the requested items are in high demand and short supply, the vending machine control system may determine that the subscription price should only be set at a 2% discount relative to the subscription items' retail prices. Additionally or alternatively, the vending machine control system may output subscription terms that account for the high demand nature of the requested products by, for example, requiring the customer to accept at least one out-of-stock event during the subscription period.

Step 2: Output a subscription offer.

Offers may be output via any output device described herein. In some embodiments, offers are output through an LCD display. Exemplary subscription offer content designed for a touch screen or LED/keypad combination is illustrated in Figures 2A and 3. Figure 2A illustrates an embodiment in which a customer is proactively offered a choice to accept one of two subscription offers. Figure 3 illustrates an

embodiment in which a single subscription offer is triggered in response to a customer's deposit of \$5.00.

Step 3: Register a subscription offer and output subscription code.

A customer may accept a subscription offer by so indicating via the vending machine's input device. For example, a customer may accept a subscription offer by pressing a button on a vending machine's touch screen or keypad. In an alternate embodiment, a customer may accept a subscription offer by pressing a button on the keypad of a cellular telephone. Further, a customer may accept a subscription offer orally, in which case the vending machine control system may receive an acceptance signal directly through a microphone attached to the vending machine or indirectly through a microphone attached to another device, such as a customer's cellular telephone.

Additionally or alternatively, a customer may accept a subscription offer by tendering payment of the subscription price.

Once accepted, a vending machine subscription is registered in a database, such as the illustrative subscription registration table of Applicant's U.S. Patent Nos. 6,298,972, 6,085,888, and 5,988,346 (Figure 5 therein). The registered subscription information may include a subscription code, an indication of the quantity remaining in the subscription, and an indication of the terms of the subscription (e.g. subscription expiration date, redemption times, etc.).

The subscription code may be generated by the vending machine control system or may be merely identified from a list of available (i.e. not-yet-issued) subscription codes. Alternatively, as discussed above, the subscription code may be provided by the customer (e.g. the customer's birthday; the serial number of a five dollar bill entered into the vending machine by the customer; the customer's credit card number; biometric data provided by the customer). Further, in embodiments where the customer redeems the first subscription item during the registration transaction, the subscription code may be linked to the first product redeemed in the subscription. For example, the subscription code may be included on the packaging of the first product (e.g. a code underneath a bottle cap; a code identified by a radio frequency transmitter affixed to the product's packaging).

In some embodiments, more than one code is identified and output to the customer. For example, in some embodiments, each prepaid item in the subscription may be associated, in a database, with a different code. In such embodiments, the vending machine may dispense several tokens, such as printed vouchers, each containing a different code.

Generally, customers who accept subscription offers may be issued, through a printer such as those described herein, a printout containing subscription information (e.g. an account identifier). The printout may be used by the customer to redeem subscription items upon subsequent visits to the vending machine (Step 4, below). For example, the customer may enter a code contained on the printout into the vending machine's keypad. The control system would in turn determine whether or not the code is valid, and if so, activate an item dispenser corresponding to the subscribed-to product (Step 5, below), and update an account record in a subscription database (Step 6, below). A printed subscription card containing a subscription code may appear as follows:



In some embodiments, the output of tokens such as subscription cards may be preceded or accompanied by a message output via a touch screen or LCD, such as the “thank you” message depicted in Figure 4.

Alternatively, customers who accept subscription offers may be issued a read/write magnetic stripe card that is updated upon subsequent visits to reflect the redemption of subscription items (Steps 4-6, below).

In other embodiments, customers who accept subscription offers may be provided with subscription information via other output devices (other than printers), such as LED or LCD displays (e.g. subscription codes may be provided on such displays), audio

speakers, or the like. Such customers would be required to remember subscription codes. Thus, in some embodiments, customers may be prompted, as part of the subscription registration step, to provide challenge questions and/or response answers so that, should the customer later forget his code, he may be asked the registered question (e.g. What is your pet's name?) and provided with the code if the customer's answer (e.g. the provided pet name) matches that which was previously stored in a database during the registration step.

In some embodiments, customers may register subscriptions online, for example, via the Internet. In such embodiments, customers may use a personal computer or Web-enabled cellular telephone to log on a Web site associated with the vending machine operator. Customers may be presented with subscription offers through the Web site, and may register for subscriptions by authorizing credit card charges in amounts corresponding to subscription prices. In some embodiments, customers are provided with a single subscription code for each subscription. In other embodiments, customers are provided with several subscription codes for a single subscription. In such embodiments, subscription codes maybe emailed to customers periodically (e.g. a new code every week).

In embodiments where customers register for subscriptions online, the issuance of subscription codes may be handled in several ways. In one embodiment, new codes are generated upon registration, and such codes are made available to one or more vending machines so that, upon redemption of a subscription item, such vending machines may confirm that presented codes match the issued codes. In another embodiment, duplicative lists of subscription codes are maintained both by the host computer that facilitates registration, and by the one or more vending machines that facilitate redemption. Thus, in such “duplicative list” embodiments, a real-time communication link need not be established between the vending machine and the registration computer during a redemption transaction (Steps 4-6, below).

Step 4: Receive request to redeem subscription item(s).

After a registration transaction has been successfully processed, subscribing customers may proceed to use subscription codes to redeem subscription items at a

vending machine by indicating to the vending machine that the customer so desires to redeem one or more subscription items.

In some embodiments, a redemption transaction is initiated when a customer sends a signal to the vending machine control system through an input device such as a touch screen or keypad. In some embodiments, a dedicated button of a touch screen or keypad may function to allow customers to initiate a redemption transaction.

In other embodiments, customers may be allowed to fill a virtual “basket” of goods by selecting items and quantities through one or more input devices. The vending machine control system may store an indication of the selected products in a temporary memory, such as RAM. After a customer indicates which item or items he or she wishes to purchase, the vending machine control system may output, through an output device such as a touch screen or LED display, a menu of payment options, including but not limited to (1) a cash payment option, (2) an option that allows subscription customers to redeem one or more items with a subscription code, and/or (3) a credit payment option.

As stated, subscription codes may be presented either directly into input devices such as keypads and touch screens, or via machine-readable tokens, such as bar coded vouchers or magnetic stripe cards.

Step 5: Determine whether to honor request, and if so, dispense subscription item(s).

After the customer has indicated a desire to redeem a subscription item with a subscription code, the vending machine control system determines whether or not to honor the request by determining (1) if the subscription code is valid, and (2) if the requested item is out of stock or otherwise unavailable.

As discussed with reference to Applicant’s U.S. Patent Nos. 6,298,972, 6,085,888, and 5,988,346, subscription codes may be validated by determining (a) whether or not the underlying subscription has expired, and/or (b) whether or not all products in the subscription have been redeemed. As described, such a validation step may be executed by consulting a record corresponding to the subscription in a subscription registration table. For example, if a corresponding record indicates that the customer only has 3 items remaining in a subscription, he may not be permitted to redeem 4 items with the corresponding subscription code. Conversely, if a customer has

indicated a request to redeem 3 items, he may be permitted to so redeem the items if his subscription file indicates that he has 4 remaining units in his subscription. Thus, customers may redeem more than one item during a redemption transaction, so long as the vending machine control system can validate the provided subscription code in light of the quantity of unredeemed items in the customer's subscription.

If the subscription code is validated, the vending machine control system would determine whether or not the requested item is out of stock, for example, by consulting an inventory database. Further, the vending machine control system may determine whether or not the requested item is reserved for another subscriber, such as a subscriber who has paid a premium to guarantee availability of subscription items (i.e. a "hard reserve" feature).

Various methods are contemplated for handling situations where a subscribing customer attempts to redeem a product that is sold-out or reserved for another subscribing customer, including: (1) offering a better or comparable substitute product⁶, (2) adding an additional unit or units to the customer's registered subscription, and/or (3) offering "value" back to the customer, including but not limited to (i) refunds or rebates for the full retail price of the item requested, (ii) refunds or rebates for the price paid per unit of the subscription item, and/or (iii) sweepstakes entries. In some embodiments, refunds or rebates may take the form of cash or vouchers for machine credit. Vouchers for machine credit may optionally have usage restrictions associated therewith, such as time windows and expiration dates.

Further, where requested products are sold-out or reserved for other subscribing customers, output devices may be configured to output one or more messages. In one embodiment, "reserved" products are so indicated through LED lights or any other output device. Further, in some embodiments, an "assurance" message is output to the subscribing customer who is denied the ability to redeem a requested item during a redemption transaction. For example, a message may be communicated through a touch screen, reading "Don't worry, you still have 8 sodas in your subscription to redeem at a

⁶ Methods for determining substitute products are disclosed in Applicant's co-pending U.S. Patent Application Serial No. 09/345094, entitled VENDING MACHINE SYSTEM AND METHOD FOR ENCOURAGING THE PURCHASE OF PROFITABLE ITEMS (Attorney Docket No. 98-119), the entirety of which is incorporated by reference herein for all purposes.

later time.” Note that a vending machine might also output a similar message in the event of a “misvend”, or mechanical error.

If the provided subscription code is valid, and if the requested item is in stock and available (i.e. not reserved for another subscribing customer), the vending machine control system may activate an item dispensing apparatus corresponding to the requested product.

During redemption transactions, vending machines may output, through output devices, a variety of other messages. For example, as shown in Figure 5, a message reading “Thank you for using your soda card” may be communicated. Alternatively or additionally, a “savings reminder” message could be communicated to the customer, reminding the customer of the per unit savings realized through the use of the subscription promotion. For example, a message may be output, reading “You saved \$.25 on this unit by purchasing a soda card!” Further, in some embodiments, balance information (i.e. how many remaining units are available for future redemption in conjunction with a registered subscription) may be communicated to customers during the redemption transaction. However, it should be noted that, in some embodiments, balance and other subscription information may be “suppressed” (i.e. not shown) until and unless affirmatively requested by a subscribing customer (e.g. through a “balance inquiry” button of a touch screen). Such concealment would function to respect the privacy concerns of subscribing customers.

It should be noted that, in some embodiments, it may be desirable to construct a machine that houses supplemental, dedicated inventory storage containers that may be exclusively used to fulfill the redemption of outstanding subscriptions.

Step 6: Update registered subscription data.

In addition to updating inventory databases to reflect the redemption of subscription items, the vending machine control system may update registered subscription data, for example, by updating records in a subscription registration table that correspond to the customer’s subscription code.

Where customers have been denied the ability to redeem requested subscription items in a given redemption transaction, and have been provided with one or more

additional subscription units to compensate them for their inconvenience, such units may be added to customer records in the subscription registration table.

In addition to or in lieu of updating subscription registration databases, the vending machine's payment processing apparatus may be configured to physically modify tokens provided by the subscription customer during the redemption transaction. For example, in an embodiment where subscription codes are provided on magnetic stripe cards, magnetic information stored thereon may be updated by the vending machine's card reader/writer to reflect the redemption of one or more subscription items. Or, in an embodiment in which tokens take the form of paper-based vouchers or cards, such tokens may be notched, hole-punched, printed on or otherwise physically altered to reflect the redemption of subscription items.

Various methods for allowing customers to renew or modify subscriptions are contemplated. In one embodiment, customers are provided, through an output device, a reminder message indicating the number of unredeemed items remaining in the subscription, along with a subscription renewal offer. For example, a textual message provided via touch screen may read "You only have 3 Cokes® left. Would you like to add 8 more to your Soda Card for \$5? Just press ACCEPT and deposit \$5."

In some renewal embodiments, the vending machine control system may dynamically construct such "renewal" offers depending on the customer's prior subscription purchase and redemption patterns. Thus, a customer who has purchased a threshold number of subscriptions in the past, and/or has consistently redeemed a threshold number of units associated with subscriptions, may be offered a subscription offer that provides for a greater subscription quantity than previously available to the customer. For example, a customer who has purchased three subscriptions to Coke® over the past three months and has redeemed 95% of the subscription items may be offered the ability to purchase a subscription to eight units of Coke® at a deeper per unit discount. In this manner, customers who have already indicated their willingness and ability to establish longitudinal relationships with a vending machine and/or a product may be provided subscription offers that are intended to increase the customer's the level of commitment.

Further, in some renewal embodiments, the vending machine and/or a remote computer may store, in a database, a financial account identifier associated with a subscription customer. Financial account identifiers include credit card numbers, debit card numbers, checking account numbers, or the like. In some embodiments, customers are provided with subscription “renewal” offers that must be affirmatively accepted by customers before subscriptions are renewed and financial account identifiers are accordingly used to charge customers for the subscription price. In such embodiments, customers may be provided with such subscription extension offers either (a) at a vending machine (e.g. during a redemption transaction), or (b) through a communications network, such as over the Internet (e.g. via Web or email) or through a cellular network. In other embodiments, customers agree to have their financial accounts automatically charged for subscription prices every time they deplete a subscription by redeeming all paid-for units in the subscription.

Miscellaneous Alternate and Additional Embodiments

Many miscellaneous alternate and additional embodiments are contemplated, as follows:

1. In one embodiment, particular inventory rows or spaces within rows may be exclusively designated for “subscription only” products that are unavailable for sale to customers who do not accept subscription offers.
2. In one embodiment, when customers attempt to redeem a product during a redemption transaction, the vending machine control system may determine that the subscribed-to product is currently in high demand and/or short supply, and may accordingly output an offer to the customer that is intended to preserve the high demand and/or short supply inventory.
 - a. In one embodiment, such customers may be offered a substitute product. That is, customers may be provided with the option of accepting another product in lieu of the subscription item (e.g. where the customer has subscribed to a high demand product like Diet Coke®, the customer may be offered the ability to take another diet drink that has an equal or greater retail price).

- b. Further, where the subscribed-to product is in particularly high demand and/or short supply, the vending machine control system may output an offer to buy the customer out of his or her subscription, for example, by crediting the customer for an amount equal to the retail price of the remaining units in the subscription. Where the customer was initially provided a per unit discount through the subscription, such an embodiment may actually function as an opportunity for the customer to earn money by taking a financial position in vending machine inventory.
3. As stated earlier, in a “hard reserve” embodiment, customers may be provided the option of upgrading subscriptions so that they are guaranteed subscription items during redemption transactions. Such “hard reserve” upgrades may be purchased at a premium relative to other subscription offer prices.
4. In some embodiments, subscribers may be notified, either through the vending machine’s output device(s) or through a communications network (e.g. via email), that service is disrupted or changed at one or more vending machines, for example, due to maintenance.
5. In some embodiments, suggested inventory configurations for restocking purposes, or “planograms”, may be designed and output based on outstanding subscriptions. Thus, in addition to or in lieu of constructing planograms based on anticipated future demand as forecasted based on previous demand for one or more products, a vending machine control system, or another computer, may retrieve information from a subscription registration database and calculate how many products are likely to be redeemed. Such a calculation may consider redemption rates for subscription promotions (e.g., only 80% of subscription items are redeemed).
6. In some embodiments, more than one individual may be registered in conjunction with a single subscription. Thus, “group” subscriptions may include several people. Each person in the group may be issued a code that references the group’s subscription information in a registered subscription database. Individual codes may be comprised of a group component (e.g. the first four digits) and an individual component (e.g. the last six digits).

7. Alternate methods for establishing longitudinal relationships with vending machine customers include the following:
 - a. The provision of discounts and benefits with no pre-payment requirement.
 - i. In one embodiment, customers, identified by unique customer identifiers (e.g. a frequent shopper card), agree to have their purchases tracked. Once customers have purchased a threshold number of goods or services, the vending machine control system may authorize a discount, rebate, free product, sweepstakes entry, or the like.
 - ii. In another embodiment, customers may agree to receive a discount unit price for an item or items, in exchange for their agreement to purchase a certain number of products over a certain period of time. Customer financial account information may be stored, so that financial accounts may be charged in the event that customers do not perform to the agreed-to terms.
 - b. In another embodiment, customers are permitted to accept subscription offers without payment up front, provided they input a valid credit card number. The credit card number may be used to secure (i.e. “lock” or “freeze”) a portion of the customer’s available credit. At the end of the subscription term, the customer may be charged the subscription price.

Spirit and Scope of the Invention

It should be noted that the embodiments described with reference to the following figures are presented for illustrative purposes only and are not meant to be limiting in any sense. It should also be noted that, as used herein, the terms “an embodiment”, “embodiment”, “embodiments”, “the embodiment”, “the embodiments” “one or more embodiments”, “some embodiments”, and “one embodiment” mean “one or more embodiments” unless expressly specified otherwise. Further, although particular features of the present invention may be described with reference to one or more particular embodiments or figures, it should be understood that such features are not limited to

usage in the one or more particular embodiments or figures with reference to which they are described.

Further, it should be noted that although process steps, method steps, algorithms or the like may be described in a sequential order, such processes, methods and algorithms may be configured to work in alternate orders. In other words, any sequence or order of steps that may be described does not necessarily indicate a requirement that the steps be performed in that order.

In conclusion, while the methods and apparatus of the present invention have been described in terms of particular embodiments, those skilled in the art will recognize that the present invention may be practiced with modification and alteration without departing from the teachings disclosed herein.

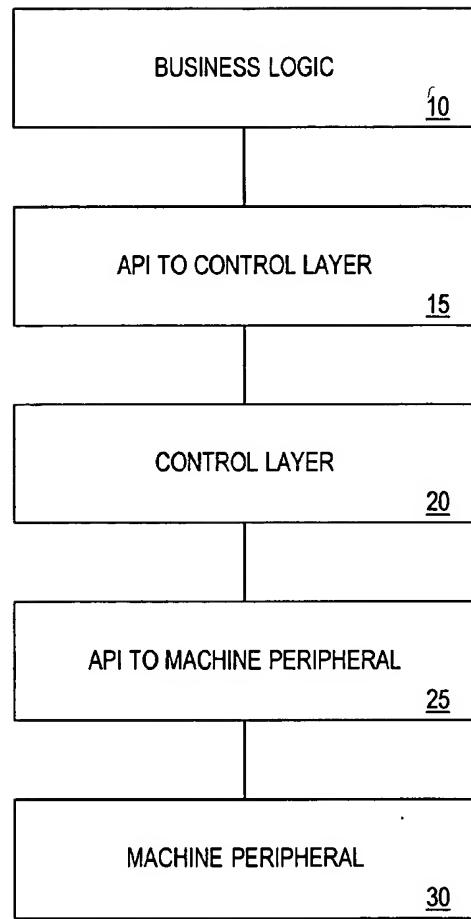


FIG. 1

FIGURE 2A



FIGURE 2B



FIGURE 3

<h2>Soda Card Value</h2> <p>1 Can Free!</p> <p>8 Cans/ \$5.00</p> <p>1 Can Free!</p>		<p>Card Good For: All Cans Bottled Water No Expiration</p>			
<p>NO</p>		<p>YES</p>			
<p>Card Prints Automatically</p>	<p>Good For 8 Free Cans</p>				
<p>Balance: \$5.00</p>					
	<p>Do You Want a Soda Card?</p>				
<p>Enter coupon code or products</p>					
<p>Clear</p>	<p>1</p>	<p>2</p>	<p>3</p>	<p>4</p>	<p>5</p>
<p>Back</p>	<p>6</p>	<p>7</p>	<p>8</p>	<p>9</p>	<p>0</p>

FIGURE 4

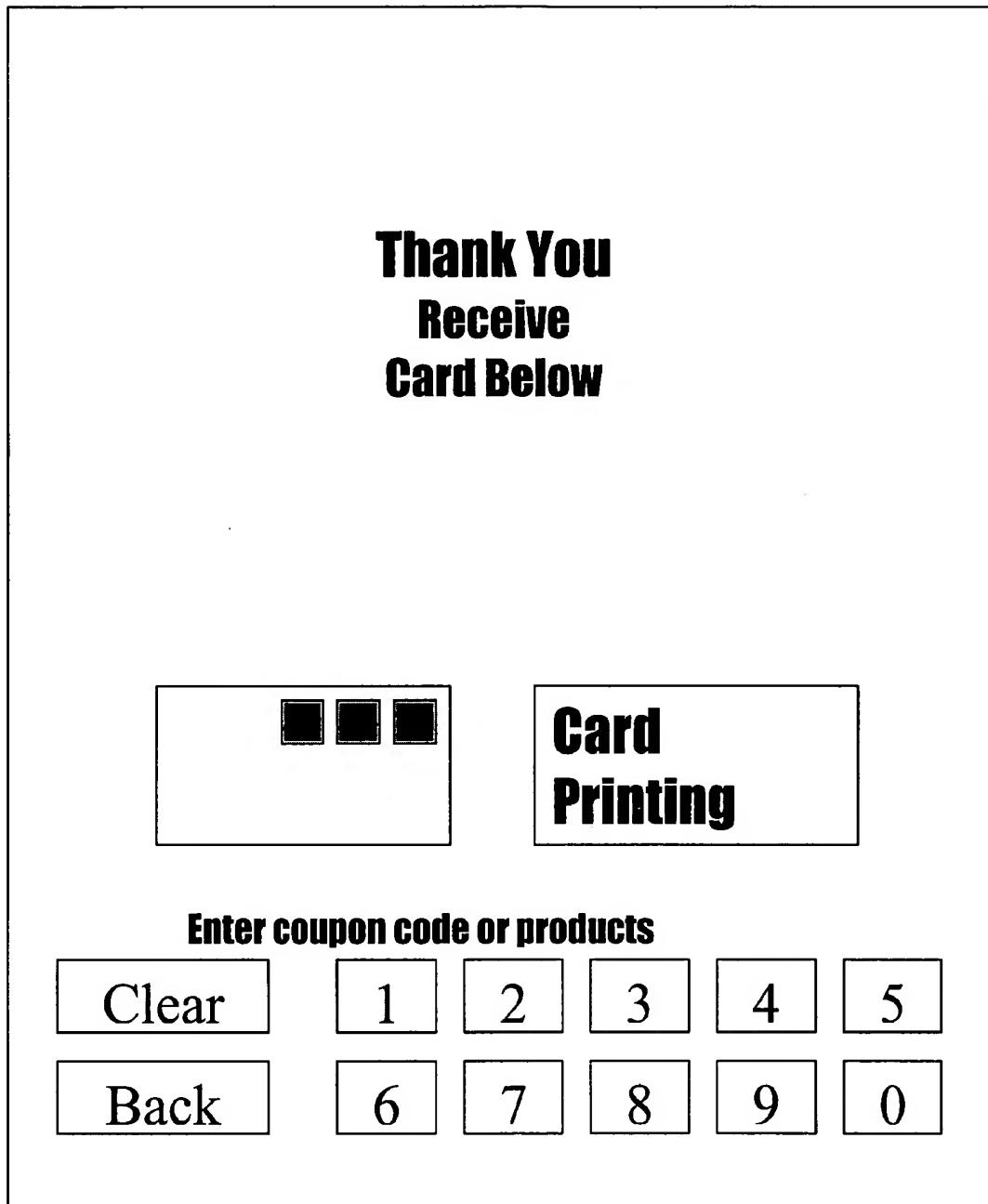


FIGURE 5

